

the thermometer. Here, however, there is no such nonsense.

The third book of this part deals with thermodynamics, and we must enter our protest once more against the mode of treatment adopted for absolute temperature. As is usual in German and French treatises temperature is first defined by the so-called law of gases, and then based on the hypothetical something called a perfect gas. Then that notion of temperature is carried into the discussion of the indicator diagrams given by Carnot's engine. Of course if a perfect gas is properly and clearly defined the discussion *can* be made logically consistent, though in what seems a forced and unnatural way; and Prof. Riecke is careful to state, though not quite all at one place, what the properties of his perfect gas are.

The true method is to define absolute temperature by means of a perfect engine, so as to get a scale independent of the properties of any known substance, and then Joule and Thomson's experiment becomes a comparison of the scales of different gas thermometers with the absolute scale, that is a test of the perfection of the gases. So far as we have been able to see, the name of Thomson is not mentioned in this section of the work!

In taking leave of this treatise we wish to say that students owe much to Prof. Riecke for giving them a readable, not too abstruse, and yet thoroughly sound and fairly full discussion of the elements of physics. To many German students who have not time to struggle through the larger treatises this book must be very welcome.

A. GRAY.

#### A NEW DEPARTURE BY THE RAY SOCIETY.

*The Tailless Batrachians of Europe.* Part II. By G. A. Boulenger, F.R.S. (London: The Ray Society, 1898.)

WE recently reviewed under the above heading the first part of the above-mentioned work, which will become classical among popular treatises upon zoology, and the second part, following so close upon it, calls for nought but the highest admiration. In the 131 pages which compose its body, the Bufonidæ, Hylidæ, and Ranidæ, are treated in a manner uniform with the contents of the first volume, with which it is serially paged. There are 14 plates, of which 10 are coloured, 4 maps, and 44 text illustrations, all of the same excellence as in the first part; and the whole work well-nigh challenges criticism, it being praise sufficient to remark that it is its author's. Although the pages deal professedly with European animals, their value is materially enhanced by the recognition of the world-wide distribution of these, with especial reference to local varieties—as, for example, the Japanese and Chinese Bufones. The difficult topic of the racial varieties of the Ranidæ is for the first time handled in popular terms, the author giving the results of his ripe experience in a concise tabular form which will be of the greatest use to both the way-side and professed naturalist. Nor is the experimental aspect of the study neglected, and concerning this, in his disproof of the Fischer-Sigwart hypothesis (p. 311),

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the author once again displays a commendable enthusiasm and love of science for its own sake which cannot fail to exercise the healthiest influence upon the reader's mind. Equally encouraging is his frequent allusion to the work of the dilettanti, not a few among his critical observations and records as to geographical distribution and breeding period being culled from the pages of journals and the publications of local Natural History Societies, which the too academic critic might be apt to ignore. Under this head the incorporation of observations like those of Mr. Norman Douglass is deserving especial comment, as furnishing encouragement to the mere lover of nature and those content to seek our familiar creatures in localities in which they are unknown, and as bringing to these persons a full assurance that their efforts do not pass unnoticed by the leading masters of their craft. To the popular mind, the record of a toad's attempt to swallow a viper, and of the edible frog's more regular habit of snake capture, will especially appeal, as an interesting fact concerning the balance of nature.

The book concludes with an appendix of 16 pages; a bibliographical index of 13 pages; and an alphabetical index to the two parts. The appendix embraces a list of the specimens preserved in our National Museum at South Kensington, and to peruse this is to realise that the work is a popular commentary upon a collection unparalleled by that of any other museum in the world—a glorious possession of the British race. With this at his command the author could not have achieved other than a great result, but still by no means the least conspicuous feature about it is the stamp of his own individuality and personal influence which it bears. His book is worthy this unique material, and the best endeavours of all concerned in its accumulation; and while congratulating the Ray Society upon the success of their new departure, we earnestly hope that its executive will forthwith consider the advisability of making corresponding and ample provision for a companion work on the Batrachia Caudata, regarding that as at present the object most deserving their support, and most worthy their old-established reputation as pioneers in the popularisation of biology.

There are a few trivial matters of terminology in the present volume, such as the usage of the words "hand," "sternum," and "anus," and one or two expressions of orientation, to which exception might be taken; but these are altogether trivial where all else has been so nobly done.

#### OUR BOOK SHELF.

*Morality independent of Obligation or Sanction.* By M. Guyau. Translated from the French (second edition) by Gertrude Kapteyn. Pp. xii + 215. (London: Watts and Co., 1898.)

IN the twilight of gods and systems has naturalism any word as to the conduct of life? The author of "The Irreligion of the Future" feels that the scientific spirit in its revolt can rest in no optimism theological or teleological, while, discounting pessimism of temperament as simply the symptom of unfitness of life, the pessimism put forward as a general solution can be shown to be bound up with psychological illusion and is negated by

the will to live. If the systems afford us no certitude, and we cannot accept the anodyne of faith, what shall a spirit which doubts all that it may, and finds its chief probabilities in the indifference of nature and the relativity of knowledge, maintain as to the problems of that life which still goes on? Is it possible, upon the positive basis of facts which we cannot doubt, to found "a small house at the foot of the Tower of Babel," leaving the latter to rear itself to heaven, if it can, and not knowing whether in the end the new structure may not need its shelter?

As the conception of duty crumbles before analysis, its equivalents are to be found in the impulse to maintain and expand life in its productive fecundity, and in life the unconscious forces are as little negligible as the conscious. I can, therefore I must, overflow creatively into and upon other life, and in the spending is my gain. The ideas of expanding action are in themselves forces tending to realisation. Such expansion is necessarily social and even self-sacrificing. The struggle for existence, if it takes a purely egoistic direction, as in the case of violence, results in outward limitation and inner loss of equilibrium; while, supposing it to take the risk and, what the plain man means by, the responsibility of speculation or action, it realises the actual ideal of the moment, the hope which has not despaired of the commonweal. Thus morality without obligation is the outcome of naturalism. The so-called sanctions of morality are in part illusory, and are never wholly sanctions. The physical and physiological have no regard to intention. Remorse is not necessarily in the direction of morality. Punishment is justified only from the point of view of social defence, defence being the reaction upon attack which alone of our instincts does not lose force under the solvent of conscious analysis. We cannot substitute sanctions for obligation. The practical conclusion is a gospel of work and social fecundity: the theoretical that we stand, as it were, on the deck of some great ship lost between sky and water, and left to make what port it can; rudder there never was. But here the practical intervenes again. We will risk our all on our hopes. The rudder is still to make. "This is a great task; and it is our task."

H. W. B.

*Th. Thoroddsen, Geschichte der Isländischen Geographie. Vorstellungen von Island und seines Natur, und Untersuchungen darüber in alter und neuer Zeit. Autorisierte Uebersetzung von August Gebhardt. Vol. I., 1897; vol. II., 1898. Pp. xvi + 238, and xvi + 384. (Leipzig: B. G. Teubner.)*

THESE volumes deal with the intellectual and social history of Iceland from the earliest times to the middle of the eighteenth century, and are by no means restricted to the geographical conditions of the island. Dr. Thoroddsen wrote in Icelandic and designed his book for his own countrymen, who remain in many ways one of the most cultured, at any rate of the most reading, peoples of Europe. He has spent most of his life in the detailed study of the geology of Iceland, on which he has written many monographs of great value, and now he is publishing the results of researches in a different direction, which have involved much searching of the archives of Iceland and Copenhagen; a great part of the text being derived from MSS. which have never before been printed.

The translator appears to have done his work with care and discrimination, but it must have been an unusually arduous task, as the old documents cited were in archaic Icelandic very difficult to render into modern German; and Dr. Gebhardt has endeavoured to preserve their flavour by imitating the contemporary German style and spelling when translating them.

The work is arranged chronologically, beginning with a

discussion of the first reference to Iceland in classical writings, and proceeding to the first colonisation by Irish monks, the second by Norse exiles, the Golden Age of Icelandic discovery which followed, and the subsequent development of the most learned literary society in Europe. The mediæval accounts of Iceland are then discussed; but here the foreign reader is at a disadvantage, as he does not occupy the standpoint of the Icelander for whom the book was written, and loses much of the humour of the various misrepresentations of fact. The story of the narrow escape which Iceland made from becoming an English colony in the fifteenth century, when it was the great fishing ground for Bristol and Scarborough smacks, and the manner in which German commercial interests triumphed, has special interest for English readers. An account of the renaissance in Icelandic literature after the Reformation completes the first volume. The second volume deals largely with superstitions and witchcraft in the sixteenth and seventeenth centuries; and gives details of the first native descriptions of the country and the first surveys of Iceland, as well as recounting the services of Icelanders to science in general. These were, however, of no very great moment, and by no means so interesting to read of as the highly developed system of magic and witchcraft for which Iceland was famous in the preceding century.

An island of any sort is a fascinating thing to explore and to describe. It presents possibilities of completeness denied to countries which form part of a continent, and Dr. Thoroddsen has given his countrymen a book to study and to think over. For the sake of the foreign reader we hope that on the completion of the work he will himself retell the story in one handy volume, written with the object of making outsiders acquainted with Iceland and its people.

H. R. M.

*The Telephone. Outlines of the Development of Transmitters and Receivers.* By Prof. William J. Hopkins. Pp. ix + 83. (New York and London: Longmans, Green, and Co., 1898.)

A CLEAR and connected explanation of the principles underlying the action and the design of telephone transmitters and receivers is given by Prof. Hopkins in this volume. The work is by no means exhaustive; indeed, men engaged in practical telephone construction may object that it is not full enough to be of real service. But as a general survey, for the instruction of students of telephony, the book contains a distinct view of the subject, into which details can be worked later on. The book begins with a chapter on the analysis of vibrations of sounding bodies. Following this is a short account of Reis's and Bell's telephones; and then come chapters on the development of transmitters, early successful types of transmitter, the results of systematic investigations upon transmitters of various types, granular transmitters, magneto instruments, and the design of receivers. This outline is sufficient to show that the volume provides students of practical electricity with a good view of telephone construction. The text is elementary enough to be read with interest by the general public.

*Mathematical Examination Papers for Use in Navy Classes in Schools.* By the Rev. J. L. Robinson, M.A. Pp. vii + 143. (London: Rivingtons, 1898.)

THIS collection of examination questions in arithmetic, algebra, geometry, mixed mathematics (including elementary trigonometry), and mechanics, and geometrical riders, will be found of real service by teachers preparing candidates for admission to naval cadetships of the Royal Navy. The student who works through the questions will be able to sit for the examination with an easy mind.